all the predicted deaths over all future years were to be added up, the totals would be very large, 100 to 800 per plant-year."[3] Multiplied by 75 plants, this corresponds with 7,500 to 60,000 deaths per plant-year, moving nuclear power up to between third and sixth place, in the company of motor vehicles and handguns.[2]

The philosophical question of discounting future deaths, "just as future incomes are discounted to represent the smaller value of future events in present-day calculations,"[3] need not be argued here. What is important is that, contrary to popular perception, the greatest risks from nuclear power may accrue in the uranium mining states, where an estimated 140 million tons of uranium mill tailings lie unprotected in both isolated and populated regions.[4]

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REFERENCES

1. Hendee W: Real and perceived risks of medical radiation exposure. West J Med 1983 Mar; 138:380-386
2. Sinclair W: Effects of low-level radiation and comparative risk. Radiology 1981; 138:1-9
3. Schurr S, Darmstadter J, Perry H, et al: Energy in America's Future. Baltimore, Johns Hopkins, 1979
4. Carter L: Uranium mill tailings: Congress addresses a long-neglected problem. Science 1978; 202:191-195

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Dr Hendee Responds

TO THE EDITOR: In my article "Real and Perceived Risks of Medical Radiation Exposure," Figure 3 is a histogram of estimated deaths per year from selected societal activities compared with those from medical x-rays and nuclear power computed by assuming a linear relationship between dose and effect. In all likelihood, this computational procedure overestimates the hazard of x-rays and nuclear power. Superimposed upon the histogram is the perception of relative risk of the activities as revealed by a public opinion poll conducted, as credited in our article, by Decision Research, Inc. The superimposition was provided to illustrate the disparity between real and perceived risks; it was not our intention to imply that the perception of risk is a quantifiable parameter in terms of deaths per year, and this interpretation by Shiffman and Shusterman is a bit surprising.

The argument of freedom of choice in risk assumption is one that has been debated endlessly and to which I have little to contribute other than to suggest that in our society the freedom to choose among risks is probably more limited than we would like to believe. For example, few of us have the luxury to absolve ourselves completely from involvement with motor vehicles.

For reference to the public opinion poll data, Schiffman and Shusterman may wish to follow my example of contacting Decision Research, Inc. of Eugene, Oregon, directly. Dr Shusterman is correct in pointing out that nuclear power occupies the 20th, rather than the 30th, position on the actual risk scale; however, this position is appropriate only insofar as the estimated number of deaths per year from nuclear power has some validity.

In the summary of my paper, the point is made that "multiplying this immeasurably small estimate of risk by very large populations yields numbers that seem to imply that significant health effects occur following exposure to small quantities of radiation." I appreciate the fine illustration of this point furnished by Dr Shusterman.

I do not believe that the accusation of "making frivolous comparisons of distorted data taken out of context" warrants any comment.

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